

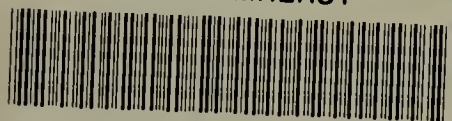
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**Reducing Solvent Use  
in  
Vapor Degreasers and Dryers**

The EPA has estimated that in vapor degreasing 70 - 80% of the solvent used is eventually lost to evaporation. Much of this loss is due to the inefficient operation of the equipment. This loss can be reduced through modifications and preventative maintenance.

Changes to existing solvent degreasers and dryers can generally be put into four categories; Process Changes, Operator Training, Mechanical or Maintenance Changes, and Design Changes.

**PROCESS CHANGES**

Process changes are generally low cost options and can usually be implemented very quickly. The following are some examples of process changes.

**Avoid air currents over degreaser**

Reduce excessive exhaust velocities. Fans blowing directly over degreasers or dryers to dissipate solvent vapors will increase the rate at which the solvent is lost. Excessive exhaust is generally indicative of other problems in the operation of the equipment.

**Eliminate "drag out" of solvent**

Redesign racks or baskets to provide maximum drainage of the solvent. The orientation of the parts should also promote maximum drainage.

Make sure the parts are at the optimal temperature (where all condensation has stopped) before removing the parts from the degreaser or dryer.

**Remove oil buildup**

Excessive oil will increase the rate of solvent degradation and will increase consumption.

## **Use the minimum amount of heat to boil solvent.**

Any energy put into the degreaser as heat will have to be removed with the cooling coils.

## **Make sure cooling is sufficient**

The vapor layer should not extend more than 1/2 way up the cooling coils.

The vapor layer should not change drastically while parts are introduced or removed from the degreaser.

A general rule of thumb is that the temperature difference between inlet and outlet of the cooling coils should not exceed 15°F.

# **OPERATOR TRAINING**

Many degreasing and drying operation emissions are highly operator dependent. Operators should be periodically trained in the proper operation of degreasers and dryers.

## **Only spray in or below the vapor zone**

Spraying above the vapor zone will increase the solvent emissions.

## **Examine load size**

If the mass of the parts being processed is too large, an excessive vapor drop with slow recovery can occur. This will increase the consumption of solvent.

If parts being processed are too large in size the motion of inserting or removing them can create a suction effect, forcing vapor out of the degreaser or dryer.

## **Parts Movement**

The vertical and horizontal movement of parts should not exceed 11 ft/min to prevent air currents. Air currents will increase fugitive solvent emissions.

## **Record Keeping**

Accurate records should be kept of all additions of solvent to the equipment. Unexplained increases in usage could indicate operational problems.





## **Mechanical or Maintenance Changes**

Mechanical or maintenance changes normally have a minimal cost associated with them and can usually be implemented very quickly.

### **Remove potential sites for leaks**

Remove threaded pipe fittings where ever possible. Replace them with welded pipe or flanged fittings.

### **Institute a Preventative Maintenance program.**

Inspect piping and pumps for leaks on a regular basis. Use an electronic detector if possible.

Check the cooling system for proper flow and keep a record of the flow rates. This will help identify when resistance to flow begins to occur.

### **Review procedures for unit when not in use**

Keep the unit covered when not in use to prevent solvent loss.

The cooling should be left on whenever there is solvent in the unit. The cooling should be the first thing turned on before filling and the last thing turned off after draining.

### **Remove Corrosion Products**

Remove any corrosion products from inside of the unit. Corrosion products from acid attack usually produce chlorides which can reduce solvent life. Most suppliers can furnish acid acceptance test kits as well as directions for their use.

## Design Changes

Design changes could add tremendously to the efficiency of the system. However, in many cases it may involve substantial cost and should only be undertaken after a thorough engineering evaluation of the present system.

### Extend Freeboard

Diffusional losses are directly related to the freeboard height. Increasing the freeboard height will reduce the losses.

### Install a freeboard chiller

Freeboard chillers are refrigerated coils that reportedly can reduce solvent losses by placing a layer of cold air above the vapor zone.

### Water Separator

Add a water separator and a separate water trough below the refrigeration coils to prevent condensate water from entering the solvent chamber.

### Install Covers

Install manual or automatic covers to keep the unit closed when not in use. The covers should slide on and off as opposed to the "swing open" type.

### Exhaust Reclaim

Install an activated carbon system to capture solvent emissions. These systems can often be regenerated with steam with the solvent portion being reclaimed.

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